



Advanced Functionalities in Optical Data Links

Puerta Ramírez, Rafael; Tatarczak, Anna; Cimoli, Bruno; Estaran Tolosa, Jose Manuel; Vegas Olmos, Juan José; Tafur Monroy, Idelfonso

Publication date:
2015

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):
Puerta Ramírez, R., Tatarczak, A., Cimoli, B., Estaran Tolosa, J. M., Vegas Olmos, J. J., & Tafur Monroy, I. (2015). *Advanced Functionalities in Optical Data Links*. Poster session presented at DTU Fotonik Seminar 2015, Lyngby, Denmark.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Advanced Functionalities in Optical Data Links

Rafael Puerta

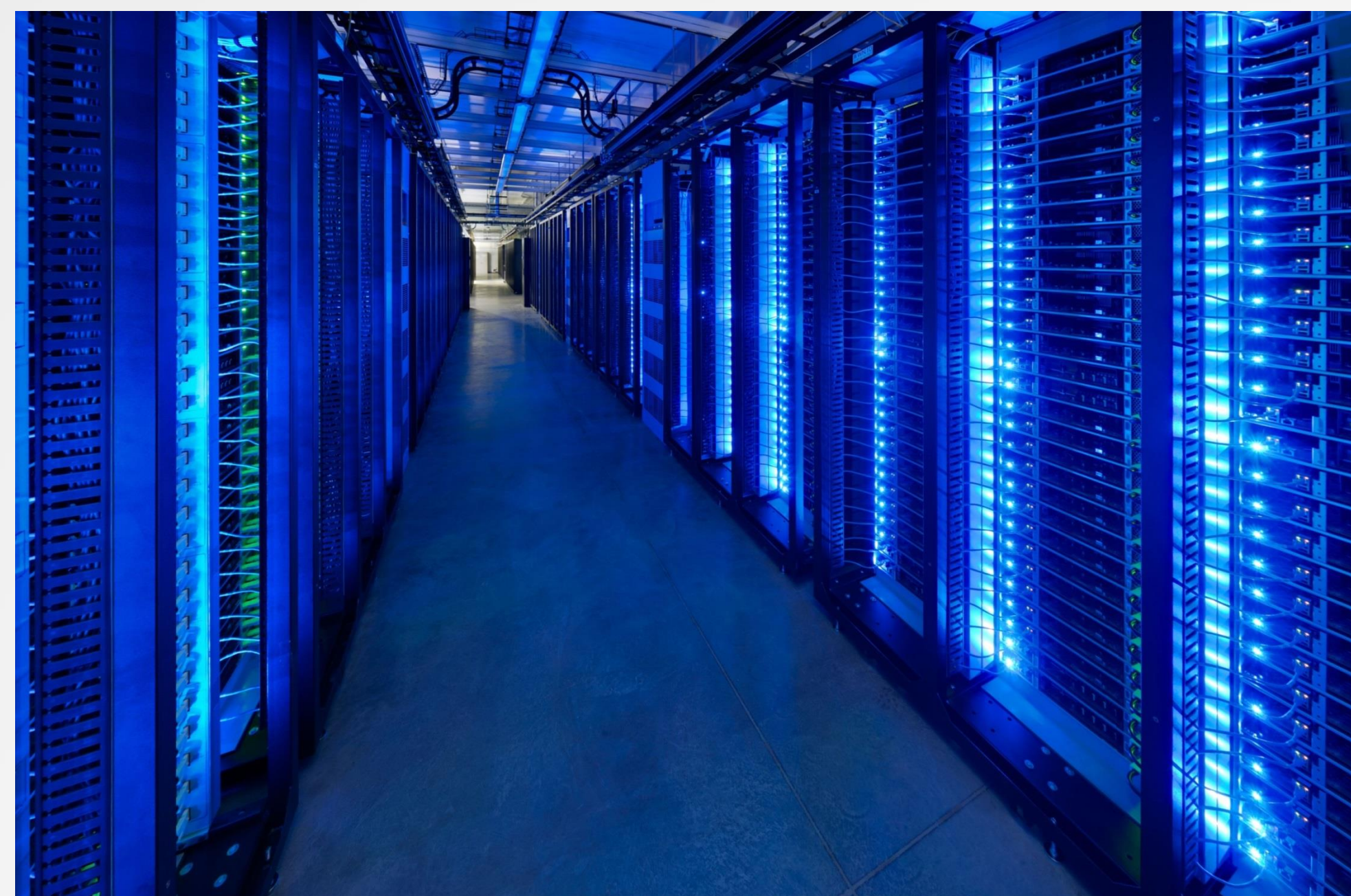
Anna Tatarczak, Bruno Cimoli, J. Estaran, J.J. Vegas Olmos, I. Tafur Monroy

DTU Fotonik, Technical University of Denmark (DTU), 2800 Kgs. Lyngby, Denmark

rapur@fotonik.dtu.dk

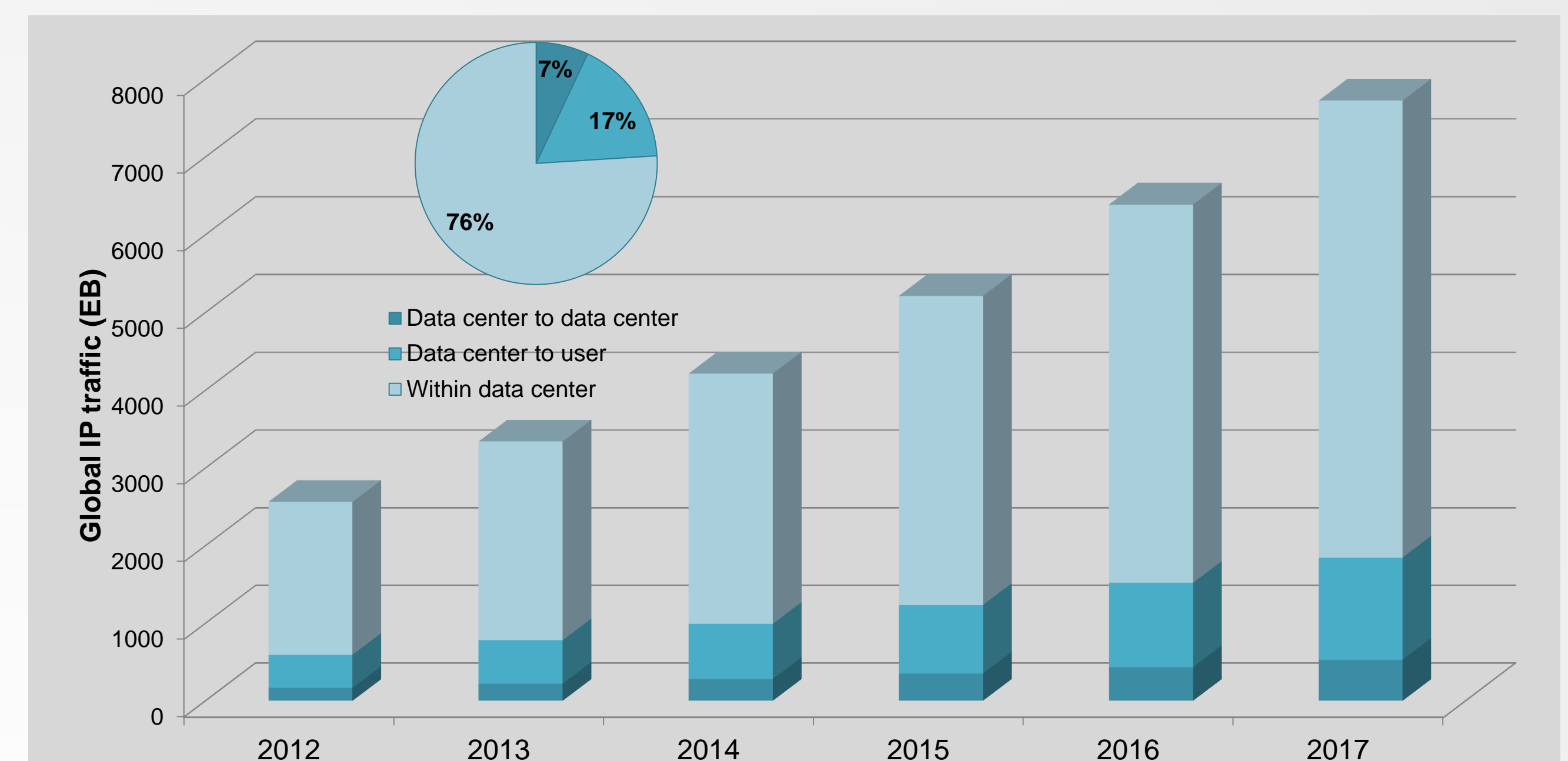


Scenario: Data center



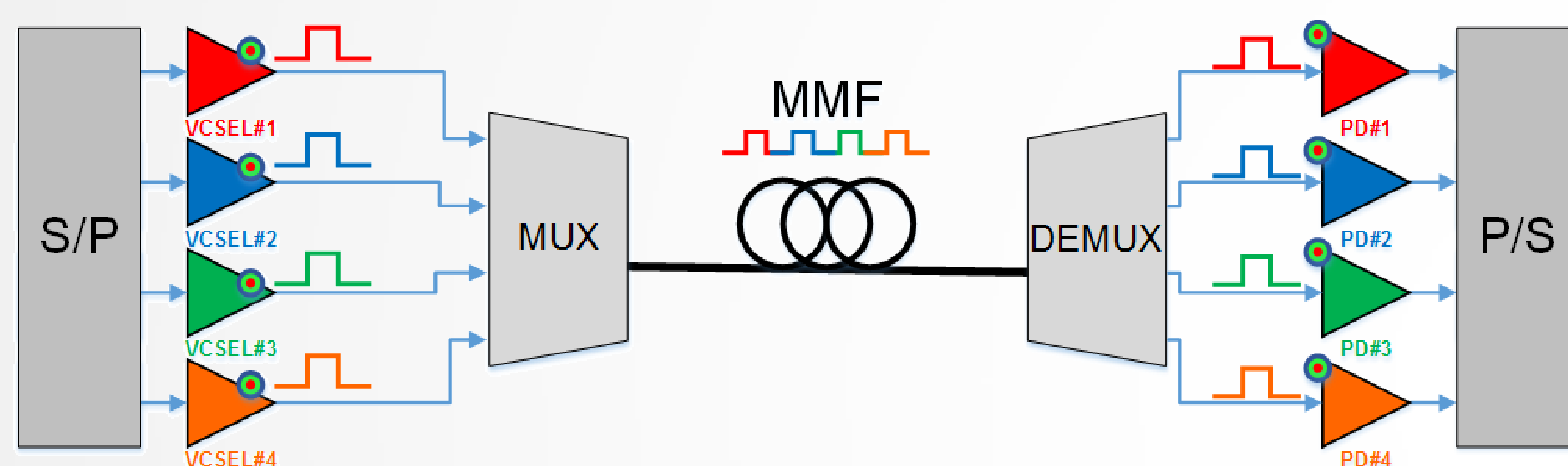
- In 2017 global IP traffic in data centers will be more than the double of 2013.

Need: IP traffic growth



- Short range links within data centers are 76%.

Multiplexing WDM for 100G solutions



- Short range data links key components:

- MMF (most common: OM3 and OM4)
- VCSEL (low power consumption and array integrability)

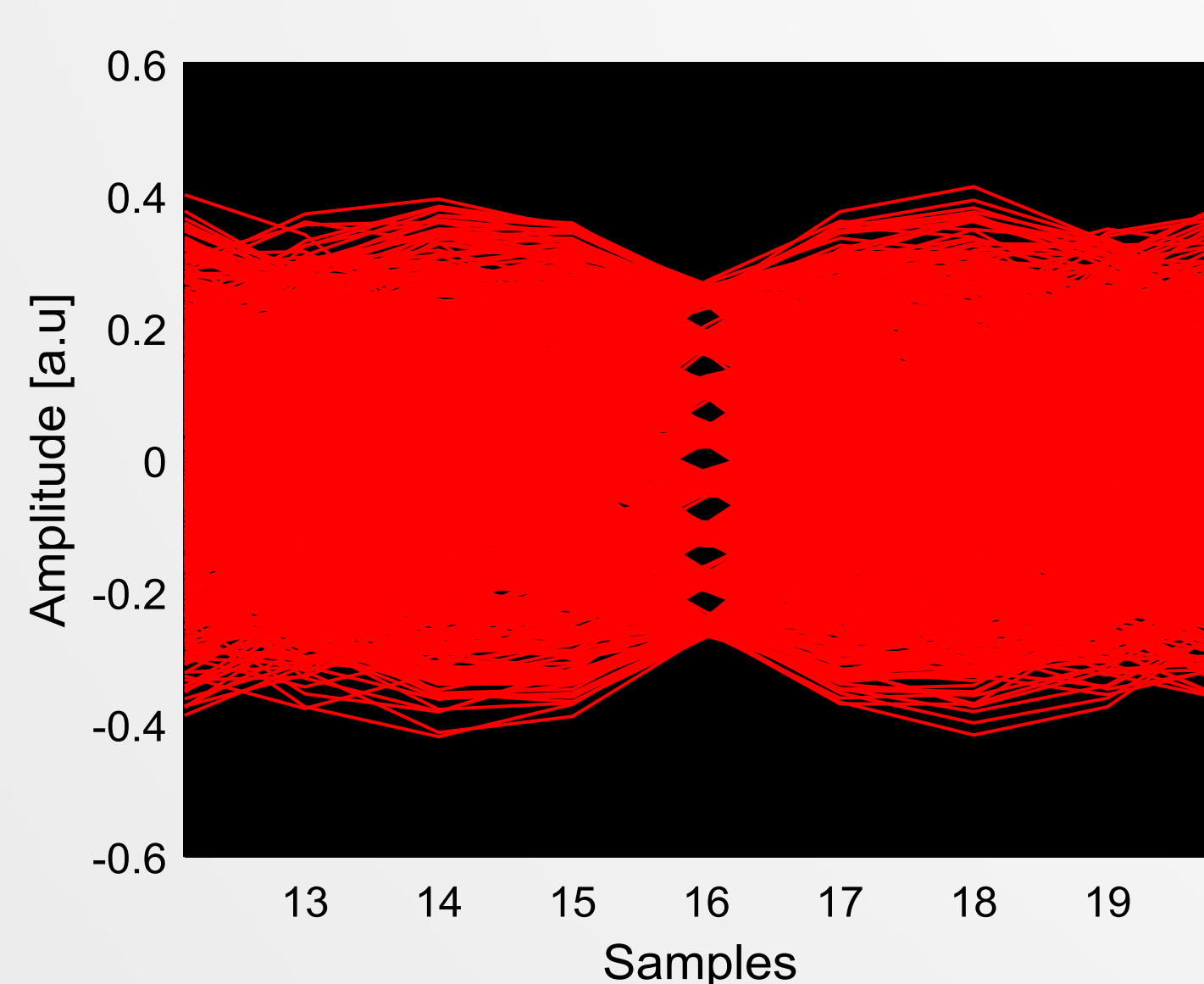
- WDM: 4x25G channels:

- Require MUX and DEMUX
- PIN PD with large operating wavelength range

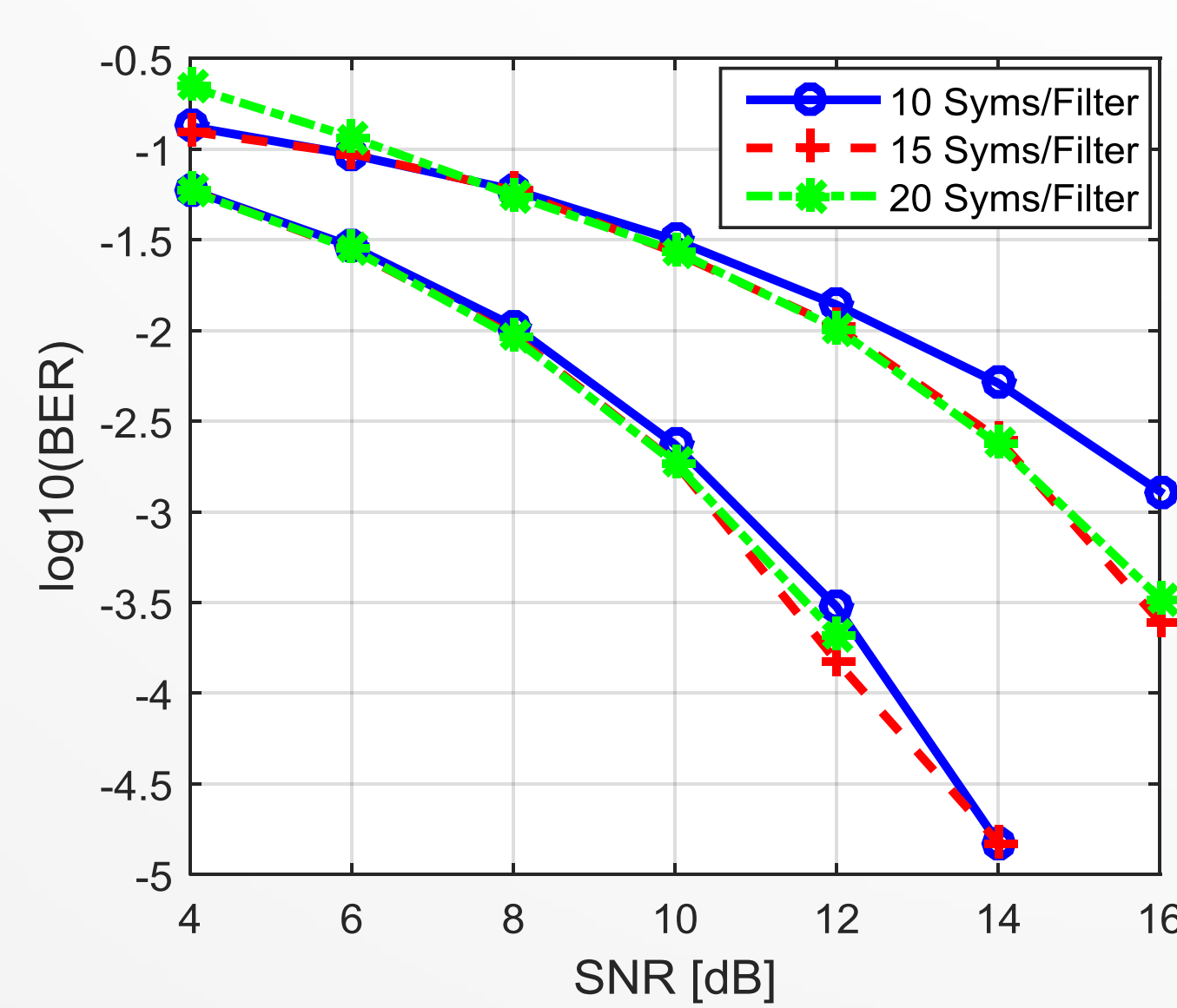


Modulation Formats

- CAP: Simple receiver (no carrier recovery needed).
- MultiCAP: Multiband CAP approach (advantages of DMT but simpler implementation).

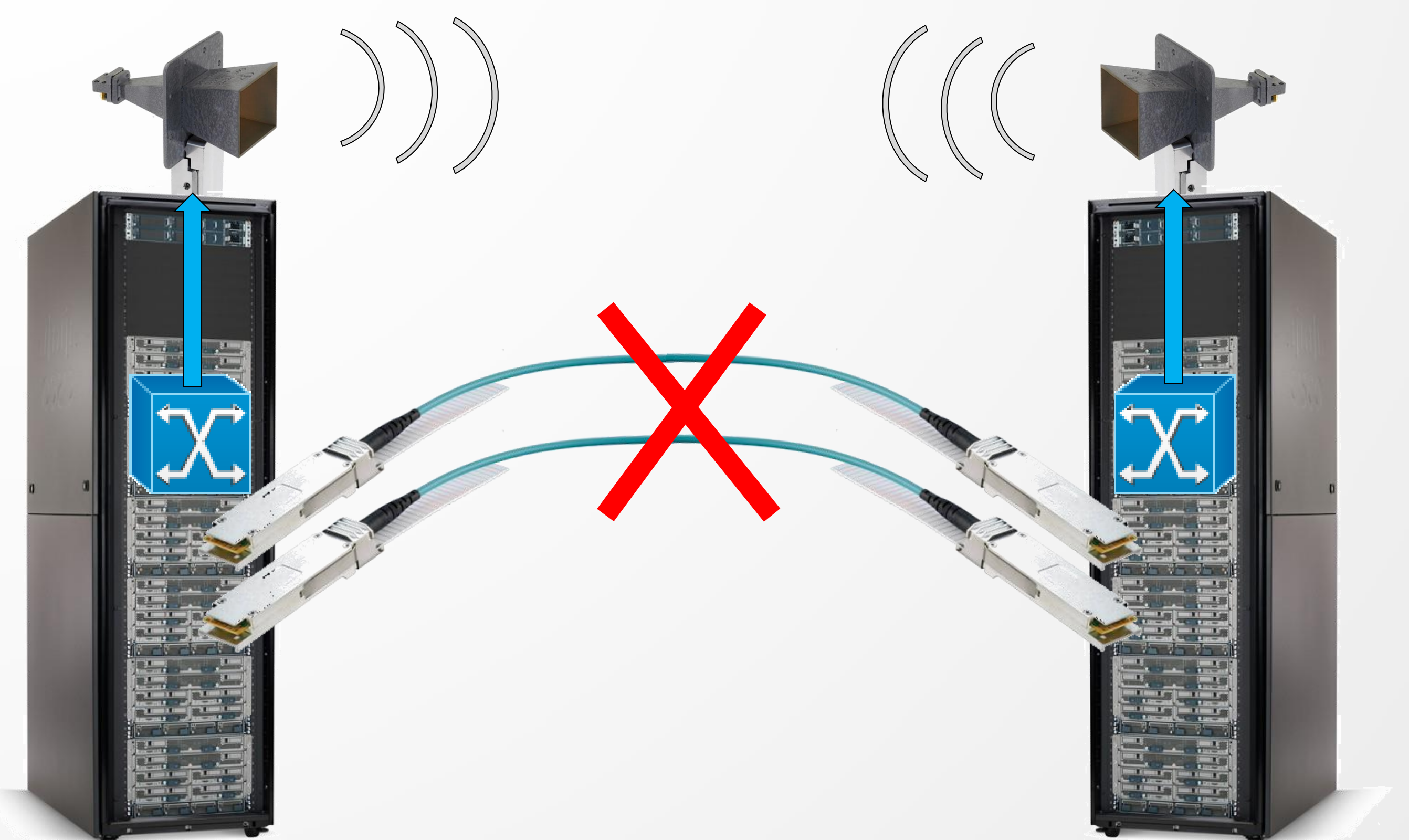


Eye Diagram



BER curves

Switching



Conclusion

- Short range WDM transmission at 100 Gbit/s is feasible with existing technology.

Future Work

- The potential of 100G and upcoming 400G data links using WDM techniques and advanced modulation formats (e.g. Multiband CAP).
- High Dimensional Modulation techniques (Orbital Angular Momentum, 3D/4D Orthogonal Basis Functions).
- High capacity fiber-wireless links using portrayed techniques.